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U.S. Environmental Protection Agency
Region III Superfund Program

Record of Decision
Operable Unit 8 (Areas B and C)

Avtex Fibers Site
Front Royal, Virginia

September 2000

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Front Royal, Virginia

I. THE DECLARATION

A. Site Name and Location

The Avtex Fibers Superfund Site is located at 1169 Kendrick Lane in Front Royal, Virginia (Site). The Site is located in northwestern Virginia, along the boundary of the Blue Ridge Mountains and the northern entrance of Skyline Drive in the Shenandoah National Park. This Record of Decision (ROD) addresses Operable Unit 8 (OU8) of the Site. OU8 consists of an open field (approximately 24 acres referred to as Area B), and a paved parking lot (approximately 10 acres referred to as Area C) located in the northeast portion of the Site (see Figure 1). The operable unit specifically addresses soils in Areas B and C.

B. Statement of Basis and Purpose

This decision document presents the Selected Remedy for OU8 at the Avtex Fibers Superfund Site in Front Royal, Virginia, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record file for this action. The Commonwealth of Virginia concurs with the Selected Remedy. (See attached letter dated September 27, 2000)

C. Assessment of Site

The response action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances or contaminants from this Site that may present an imminent or substantial endangerment to public health or welfare.

D. Description of Selected Remedy

The Town of Front Royal has zoned Areas B and C for industrial land use, and future land use is reasonably anticipated to remain industrial or commercial. Residual contamination was identified in Areas B and C in the form of volatile organic compounds. The few constituents detected in soils were below EPA Region III risk-based screening levels for soil ingestion under an industrial exposure scenario, therefore, these constituents do not pose a risk to human health for commercial/industrial land use. Arsenic was the only constituent that exceeded the risk-based screening criteria for an industrial exposure; however, the levels of arsenic present were determined to be "background" concentrations. Although the residual contamination in shallow soil in Areas B and C does not pose an unacceptable risk to human health under an industrial soil exposure scenario, the risks associated with land use other than commercial/ industrial use were not evaluated. Consequently, there is uncertainty as to whether risks would be within an acceptable range if future land use changed (e.g., residential use). Therefore, the Selected Remedy addresses the residual contamination by ensuring that the reasonably anticipated future land use remains commercial/industrial in perpetuity.

The Selected Remedy is:

- institutional controls which permanently restrict the land use of Areas B and C to commercial/industrial.

The residual contamination identified in shallow soils in Areas B and C are not principal threat wastes, therefore, treatment is neither appropriate nor necessary for the Selected Remedy.

E. Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions to the maximum extent practicable. The remedy for OU8 does not satisfy the statutory preference for treatment as a principal element of the remedy for the following reason. Treatment is not necessary to protect human health and the environment because the levels of residual contamination in Areas B and C are below EPA Region III risk-based screening levels protective of human health for commercial/industrial use.

Because the Selected Remedy will result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory mandated review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

F. Data Certification Checklist

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this action.

- Chemicals of concern and their respective concentrations – Table 1 summarizes the constituents detected and provides the minimum and maximum concentrations of each.

- Baseline risk assessment – A baseline risk assessment was not performed because the concentrations of residual contaminants detected in Areas B and C, with the exception of arsenic, were below EPA's risk-based screening criteria for the current and future anticipated land use. However, background levels of arsenic are present in Areas B and C. Further, arsenic at background levels does not pose an unacceptable risk to human health or the environment.

- Cleanup levels – Cleanup levels for soils were not established because soil remediation is not warranted in Areas B and C. These areas contain residual contaminants at levels that do not pose a risk to human health or the environment for industrial/commercial use.

- Source materials constituting principal threats – The soils with residual contamination in Areas B and C are not principal threat wastes.

- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and ROD – Current and anticipated future land use assumptions are discussed below in Part II, Section F. Areas B and C do not contain any surface water features and ground water use is not anticipated because the Site is served by the local municipal water supply system. As discussed above, a baseline risk assessment was not prepared for Areas B and C.

- Potential land and ground water use that will be available at the Site as a result of the selected remedy – Current and anticipated future land use assumptions are discussed

below in Part II, Section F. The Selected Remedy does not restrict the use of ground water in Areas B and C. However, an existing restrictive convenant that was placed on the Avtex property in December 1999 prohibits using ground water for any purpose.

- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected – These items are not addressed because the Selected Remedy does not include remedial alternatives that require capital costs or O&M. Anticipated costs to implement the Selected Remedy are addressed.

- Key factor(s) that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) – Key factors associated with the Selected Remedy are discussed below in Part II, Sections I and J.

G. Authorizing Signature

Abraham Ferdas, Director
Hazardous Site Cleanup Division
Region III

9/29/00
Date

II. THE DECISION SUMMARY

A. Site Name, Location and Brief Description

The Avtex Fibers Superfund Site is a closed fibers manufacturing plant (National Superfund Database ID No. VAD070358684) located at 1169 Kendrick Lane in Front Royal, Virginia (Site). The Site is located in northwestern Virginia, along the boundary of the Blue Ridge Mountains and the northern entrance of Skyline Drive in the Shenandoah National Park. The facility occupies approximately 440 acres situated on the east bank of the South Fork of the Shenandoah River. The Norfolk and Western railroad bisects the property and separates 220 acres of disposal areas from over 50 acres occupied by the process facility.

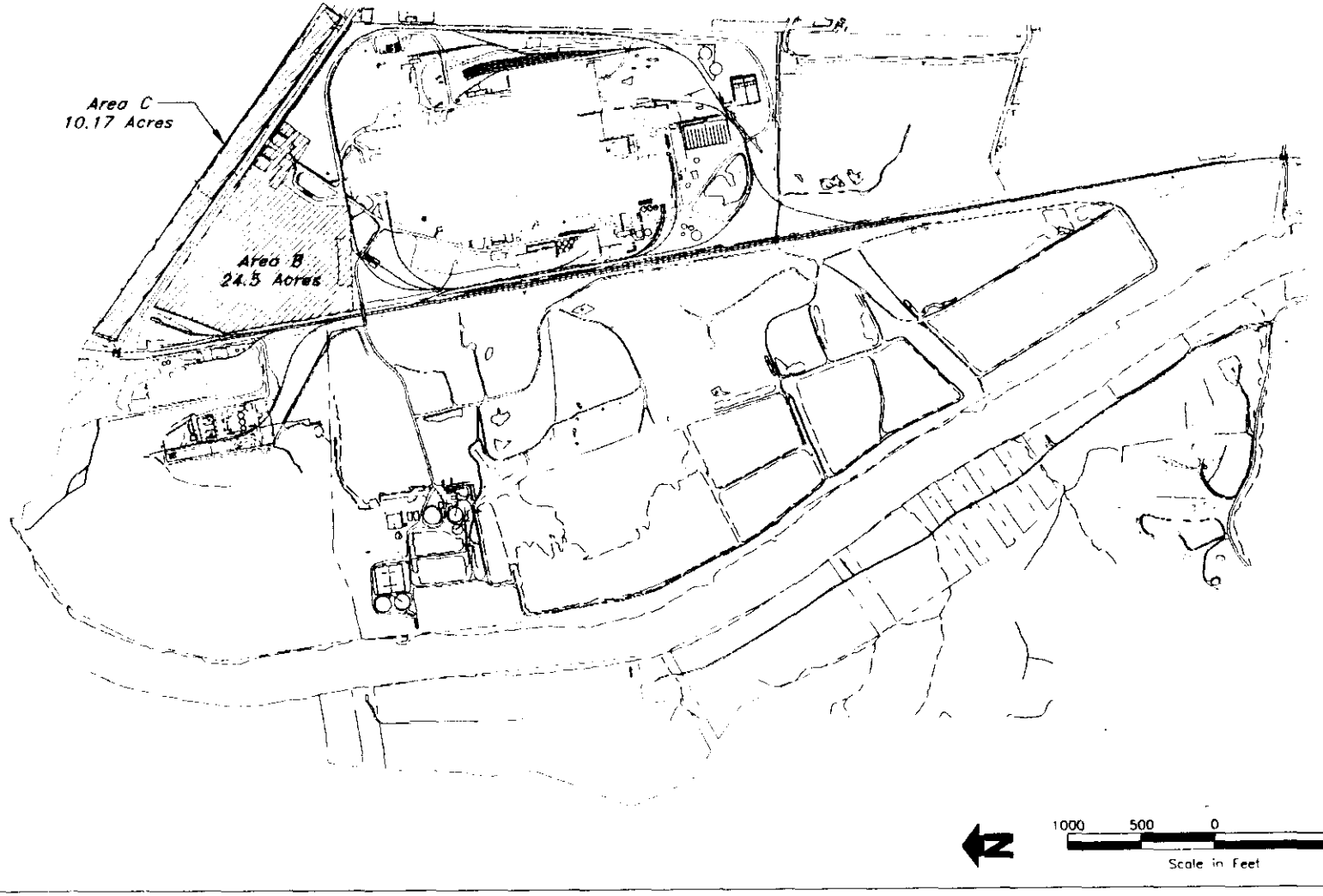
The Randolph Macon Academy borders the Site along the eastern boundary. The former General Chemical facility plant is located along the north/northwest boundary of the property. Residential areas are located to the north, south and east of the property boundaries. Drainage to the river occurs through designed features such as the discharge from the on-site wastewater treatment plant, overland storm water flow, and ground water flow.

OU8 for the Site consists of an open field (approximately 24 acres referred to as Area B), and a paved parking lot (approximately 10 acres referred to as Area C) located in the northeast portion of the Site (see Figure 1). Area B is a field vegetated with grass and shrubs, and is bordered by Kendrick Lane, the access road to the plant and the railroad. Area C is a long, narrow parcel partially covered by a gravel and asphalt parking lot, and an area vegetated with grass, shrubs and trees bordered by Kendrick Lane and a residential area.

B. Site History and Enforcement Activities

Operations at the Site began in 1940, when American Viscose opened a rayon production plant. In 1963, American Viscose sold the plant and property to FMC Corporation (FMC), and in 1976, the plant and property were sold by FMC to Avtex Fibers, Inc. Subsequently, Avtex Fibers, Inc. conveyed the plant and property to its wholly owned affiliate Avtex Fibers - Front Royal, Inc. (hereinafter both companies will be referred to as "Avtex." Rayon fibers were in constant production until the plant closed in 1989. Polyester and polypropylene were also produced over short periods of time. In November 1989, ongoing enforcement action by the Commonwealth of Virginia pursuant to state law resulted in revocation of the Avtex Fibers discharge permit. Following this action, Avtex ceased operations and shortly thereafter declared bankruptcy.

Figure 1
Location of Areas B and C
Avtex Fibers Superfund Site
Front Royal, Virginia



Operations at the plant generated three major waste types that were disposed on land as follows:

- metal-bearing wastewater from the production process was treated with lime in the Wastewater Treatment Plant (WWTP), and the sludge generated by that treatment was placed in five Sulfate Basins situated along the east bank of the South Fork of the Shenandoah River;

- fly ash generated from the combustion of coal in the on-site power plant was disposed in four fly ash basins and one stockpile; and

- waste viscose from the manufacturing process was disposed in 11 on-site basins.

The disposal areas for these waste streams are being addressed as other operable units.

With respect to Areas B and C (see Figure 1), which comprise OU8, review of a series of aerial photographs covering the period from 1937 through 1989 indicate that the plant manufacturing operations were not conducted in Areas B and C during the lifetime of operations. The presence of residual hazardous substances or contaminants detected in Areas B and C may be due to the following:

- Windblown transport – Hazardous substances or contaminants in soil would likely be the result of windblown dust or emissions from the plant stacks. Dust would have been derived from surface soils, the sulfate basins and the fly ash stockpile. The plant stack emitted process-related constituents, while the power plant emitted coal combustion by-products.

- Surface water runoff – Site hazardous substances and contaminants could have been transported to Area B by surface water runoff from the plant.

- Spills and leaks – Site hazardous substances and contaminants could have been released to Areas B and C as a result of leaks or spills of petroleum products associated with vehicle parking.

- Disposal of construction debris – Placement of scrap metal and construction debris on the ground, especially along the southern boundary of Area B, is another possible mechanism for the presence of hazardous substances or contaminants.

The combined efforts of EPA's Removal, Enforcement and Remedial programs have been used to address the many environmental problems at the Site. In October 1984, the Site was proposed for inclusion on the CERLCA National Priorities List (NPL), and

in June 1986, the listing was made final. Since being listed on the NPL, the Site has been the subject of numerous response actions performed by either Avtex, FMC or EPA. With the abrupt closing of the plant in November 1989, EPA undertook emergency and time-critical removal actions at the Site. However, the magnitude and complexity of the environmental problems at the Site warrant continuous time-critical removal actions. In addition, non-time critical removal actions and remedial responses have been taken and continue to be taken at the Site. These actions are summarized below.

Removal Action Summary. On September 26, 1989, an On-Scene Coordinator (OSC) performed a Preliminary Assessment of the Site in accordance with the NCP. This assessment confirmed the existence of a threat to public health, welfare and the environment due to the release of polychlorinated biphenyls (PCBs), the threat of fire and explosion, and concerns associated with the integrity and management practices of the bulk storage tanks and process lines used to contain or transfer hazardous substances at the Site. In response to both verbal notice and an October 31, 1989 Unilateral Order from EPA, Avtex began cleanup actions.

At the time, a concurrent enforcement action initiated by the Commonwealth of Virginia resulted in revocation of the Avtex National Pollutant Discharge Elimination System ("NPDES") discharge permit on November 10, 1989. Predicated on the permit revocation, Avtex ceased operations at the facility and at the same time informed EPA that it would not comply with the Unilateral Order. On November 11, 1989, Avtex closed and abandoned the plant, leaving large quantities of process chemicals in and around the plant area and waste disposal areas.

On February 6, 1990, Avtex filed a petition for bankruptcy pursuant to Chapter 11 of the U. S. Bankruptcy Code. On April 12, 1990, the bankruptcy court appointed a Trustee.

Even prior to the bankruptcy filing, it was apparent to EPA that Avtex would not address the immediate concerns at the Site, prompting the OSC to utilize the $50,000 authority pursuant to Delegation of Authority 14-1-A to initiate emergency stabilization actions at the abandoned Site. A Request for Funding (Action Memorandum) was submitted and approved by the Region on November 14, 1989, increasing the project ceiling to $1,914,095. A Request for Additional Funding and Exemption from the $2 million/12 month statutory limits for a Removal Action was submitted to the Office of Solid Waste and Emergency Response (OSWER) on January 5, 1990, and approved on February 2, 1990, increasing the ceiling to $9,229,095. On August 20, 1990, a second Request for Additional Funds and Statutory Exemption was submitted to OSWER and approved on October 20, 1990, increasing the project ceiling to $15,444,325. Another Request for Additional Funds and Statutory Exemption was submitted to OSWER on

October 18, 1991, and was approved on November 22, 1991, increasing the project ceiling to $20,755,975. On September 29, 1997, an additional funding request for $33,216,144 was approved by EPA Headquarters for a ceiling increase and to modify the existing scope, to continue the mitigation of threats posed by the Site, to address physical hazards and threats and implement stabilization or disposal of removed hazardous substances. This increased the ceiling to $66,972,119. The increased ceiling was necessary to complete demolition of 17 acres of the deteriorated facility and implement treatment and disposal of generated wastes.

The additional requests and approvals for funding were necessitated by the continued degradation of the former plant production area of the facility from chemical and physical weathering of the buildings, tanks, process lines, and containers. In light of this continued degradation, EPA identified existing threats, responded to new threats, and/or potential threats to human health and the environment from the chemicals and waste materials left on-site. Through 1995, EPA's emergency and time-critical removal activities focused on the removal of accessible bulk chemicals, drums, and other containers within the huge Avtex facility.

Highlights of EPA's emergency and on-going removal response activities completed by October 1995 included: transferring approximately 2,000 tons of various chemicals for recycle/reuse, on-site and off-site treatment of an estimated 241,000 gallons of flammable and corrosive chemicals, designing and operating a wastewater treatment system to protect the South Fork of the Shenandoah River from untreated discharges, closing 22 carbon disulfide impoundments which included treating approximately 992,000 gallons of carbon disulfide wastewater, and treating and removing approximately 1,300 cubic yards of carbon disulfide sludge. In addition, the contents of 33 large capacity storage tanks were drained. As part of that action, EPA effectively managed over 770,000 gallons of hazardous and non-hazardous liquids and 320 cubic yards of soil.

Based on a detailed evaluation report of the on-site buildings completed by EPA in August 1996, EPA completed another removal action in September 1998 to eliminate the physical and chemical hazards associated with nearly 25 acres of deteriorating buildings. Because of the threats posed by the buildings, approximately 17 acres of building structures were demolished during this removal action. As part of this action, over 225,000 cubic yards of debris and waste materials were generated, and 5,720,000 gallons of wastewater were managed. In September 1998, as part of a global settlement with EPA, FMC assumed the responsibility to complete the removal action for the buildings.

Pursuant to the terms of a Federal Consent Decree in effect since October 21, 1999, FMC is implementing activities associated with demolition of the remaining buildings under Time-Critical Removal Actions (TCRA) and Non-Time-Critical Removal Actions (NTCRA). The scope of the TCRA for the buildings is to characterize and dispose of the building demolition debris and accumulated solid waste generated by EPA's prior building demolition activities, and to address subgrade structures and appurtenances. FMC is currently implementing the TCRA Buildings Response Action Plan and Field Sampling and Analysis Plan approved by EPA in October 1999. FMC has initiated characterization and off-site shipment of accumulated solid waste and screening and washing of demolition debris generated by EPA's prior demolition activities.

The scope of the NTCRA for the buildings is to decontaminate the remaining buildings and address the plant sewers. Once the remaining buildings are decontaminated, the U.S. Army Corps of Engineers will abate asbestos-containing material and demolish the remaining buildings as part of non-CERCLA actions to be taken at the Site. FMC has submitted an Engineering Evaluation/Cost Analysis (EE/CA) report to EPA which assesses the extent of contamination present in the buildings and sewers and identifies and evaluates decontamination options to prepare the remaining buildings for demolition. EPA is currently reviewing this report and evaluating the various decontamination approaches.

FMC is also addressing the closure of the sulfate basins, wastewater treatment plant basins, and fly ash basins and stockpile as part of a NTCRA. In May 1999, FMC completed an EE/CA for these units, which identified the conceptual approach for closing these basins. EPA issued an Action Memorandum for these units, which selected the final remedy in January 2000. FMC is preparing the final design for the remedy selected for these units and expects to begin construction in late 2000.

Enforcement Action Summary. Avtex entered into an Administrative Order on Consent (AOC) with EPA in 1986 to perform a Remedial Investigation/ Feasibility Study regarding ground water contamination. That Order was amended in 1988 to include FMC as a Respondent. In June 1989, EPA issued a Unilateral Administrative Order (UAO) to Avtex and FMC requiring the companies to implement a ground water remedial action. Following the shutdown of the facility, Avtex notified EPA that it would be unable to carry out the requirements of the UAO. Thereafter, EPA suspended the UAO, having determined that additional information was necessary concerning subsurface conditions at the Site before a ground water remedy could be selected.

On February 2, 1990, EPA issued a UAO (i.e., the Wastewater Treatment Plant ("WWTP" UAO) to FMC requiring FMC to operate the WWTP to protect the South

Fork of the Shenandoah River. FMC agreed to comply with that UAO. Today, FMC continues to treat wastewater generated at the Site pursuant to the WWTP terms specified in the Consent Decree. In addition, FMC continues to provide potable water to four seasonal residents in Rivermont Acres, across the South Fork Shenandoah River from the Site, as required by an EPA October 1991 UAO.

In May 1992, EPA entered into an AOC with the Bankruptcy Trustee's contractors to ensure the safe and effective removal of assets from the abandoned manufacturing plant. With EPA's oversight and support, over 44 million pounds of equipment and scrap metal have been removed for recycling or reuse.

On March 30, 1993, EPA and FMC signed an AOC, Docket No. III-93-14 (RI/FS), which required FMC to complete a portion of a site-wide RI/FS. The following areas were covered under the AOC: investigation of the viscose basins, sulfate basins, WWTP basins and residuals, fill area and fly ash piles, on-site/off-site ground water, and on-site soils. EPA performed an RI/FS for the on-site buildings, river and ecological investigation and risk assessment, and investigation of off-site soils, a ball field and the sewers.

By amendment to the existing WWTP UAO in October 1998, FMC agreed to stabilize, monitor, and manage debris and waste materials at the Site as part of on-going response activities that EPA had conducted. During late 1998 and early 1999, FMC and the United States finalized negotiations on a global settlement which resulted in a commitment by FMC to conduct all future response actions at the Site pursuant to the terms of a Federal Consent Decree. The agreement was entered by the Court in U.S. v. FMC Corp. Civ. No. 5-99CV000.54 (W.D.VA 1999) (the Consent Decree) and became effective October 21, 1999. The Consent Decree requires, among many things, that FMC finance and conduct response actions for the Site based upon decision documents that are to be issued by EPA.

Remedial Action Summary. EPA issued its first ROD for the Site in September 1988, which addressed ground water contamination associated with three viscose basins on the western portion of the Site. Following the abrupt shut down of the plant and due to technical issues associated with implementing the remedy, EPA suspended that action to collect additional ground water data as part of the site-wide RI/FS.

Based on findings during EPA's emergency operations in 1989-1990, EPA issued a ROD in September 1990. Through this remedial action, approximately 7,700 tons of PCB contaminated soil and debris were excavated and disposed in an approved off-site landfill in April 1992. In addition, EPA completed the dismantling and demolition of the acid reclaim portion of the facility in April 1993. In conjunction with this action, EPA disposed of nearly 900 tons of hazardous and non-hazardous chemical waste. EPA

collected and prepared approximately 2,879 drums of wastes throughout the plant for off-site treatment and completed disposal in late Spring 1994. As part of this remedial action, security measures were implemented to protect trespassers and workers from the chemical, structural and physical hazards still present at the Site.

As discussed, under the 1993 site-wide RI/FS AOC, EPA and FMC have undertaken remedial studies to determine the nature and extent of contamination for various portions of the Site. Data from these studies have been considered by EPA in formulating the response actions described in this decision document. FMC and EPA are finalizing feasibility study work plans to address OU7 and OU10 and complete the work outlined under the RI/FS AOC. Operable units 7 and 10 are defined in Section II.D (page 14) of this document.

C. Community Participation

The RI Report, the FS Report , the Proposed Plan Fact Sheet for OU8 and other relevant documents for the Avtex Fibers Site were made available to the public in August, 2000. They can be found in the Administrative Record file and information repository maintained at the EPA Docket Room in Region 3 and the Samuels Public Library. The notice of the availability of these documents was published in the Northern Virginia Daily on August 2, 2000 and the Warren Sentinel on August 3, 2000. In addition a public meeting was held on August 17, 2000 to present the Proposed Plan Fact Sheet to a broader community audience. At this meeting representatives from EPA discussed the proposed approach for dealing with Areas B and C and answered questions. A summary of the issues raised during the public comment period, including those discussed during the August 17, 2000 public meeting, are included in the Responsiveness Summary (Section III).

D. Scope and Role of Operable Unit or Response Action

OU8 is one of ten operable units identified for the Site. These operable units are summarized below:

- OU1 addressed ground water contamination caused by fluids leaking from Viscose Basins 9, 10 and 11, but implementation of this remedial action was suspended by EPA pending the need for additional groundwater information to implement the remedy. This groundwater investigation is being performed pursuant to the 1993 RI/FS AOC. Ground water will be addressed as part of OU7;

- OU2 consisted of a remedial action to address PCB-contaminated soils by excavation and off-site disposal. This remedial action was completed by EPA in January 1992;

- OU3 was a remedial action to address the unstable acid reclaim buildings. The dismantling and demolition of the acid reclaim buildings was completed by EPA in September 1993;

- OU4 is a remedial action that addressed the need for site security to protect workers and trespassers from the physical, chemical and structural threats present at the Site. Consistent with the terms of the Consent Decree, FMC took over the lead for performing site security functions in October 1999;

- OU5 addressed the sampling, identification and disposal of drums of hazardous substances. This remedial action was completed by EPA in September 1994;

- OU6 encompassed the investigation of on-site buildings. This remedial investigation which was completed in September 1996 led to EPA's time-critical removal action to demolish high hazard process buildings in September 1997. Currently, FMC is characterizing and disposing of the building demolition debris and accumulated solid waste generated by EPA's prior building demolition activities, and will address subgrade structures and appurtenances;

- OU7 will involve remedial response actions necessary to address Viscose Basins 9, 10 and 11, ground water, and surface water. Currently, EPA and FMC are finalizing the Feasibility Study Work Plan. The feasibility study will develop and evaluate options for remedial action. Remedial actions will be conducted pursuant to the Consent Decree;

- OU8, which is addressed by this ROD, now consists of Areas B and C. The investigation of these areas was completed in September 1995. The feasibility study conducted by FMC Corporation was completed in June 2000;

- OU9 consists of the ecological investigation and risk assessment. Based on the results of this investigation and assessment, a non-time critical removal action is being performed to close the sulfate basins, fly ash basins and stock pile and the wastewater treatment plant basins;

- OU10 will involve remedial response actions necessary to address Viscose Basins 1 through 8, the New Landfill, and the wastewater treatment plant closure.

Currently, EPA and FMC are finalizing the Feasibility Study Work Plan. The feasibility study will develop and evaluate options for remedial action. Remedial actions will be conducted pursuant to the Consent Decree.

In 1995, FMC investigated the soils for Areas A, B and C at the Site. Areas A, B and C had been identified by the Industrial Development Authority of the Town of Front Royal and the County of Warren d/b/a Economic Development Authority ("EDA") as areas with potential for redevelopment in a short period of time. The EDA purchased the entire Avtex Site property from the Avtex Bankruptcy Trustee by deed dated March 27, 2000. Based on the investigation findings, EPA determined that Areas B and C had been adequately characterized for the purposes of developing and evaluating remedial alternatives. However, additional investigation of Area A, which is an open grass covered field east-southeast of the guardhouse and north of Shipping Warehouse #3 and Polypropylene Building, was needed due to the presence of sewer lines beneath the area. The sewer lines were not part of FMC's initial investigation. However, an evaluation of the sewers is now being performed as part of FMC's non-time critical removal action in the building area.

EPA subsequently requested that FMC perform a Focused Feasibility Study to identify applicable remedial approaches for Areas B and C in accordance with the threshold and balancing criteria described in the NCP so that an appropriate remedy could be selected. The issuance of this selected remedy for OU8 is appropriate. It will also facilitate the EDA's efforts to redevelop Areas B and C for beneficial land use.

E. Site Characteristics

Key characteristics of the Site with respect to Areas B and C are summarized below.

Conceptual Site Model. The primary sources of potential contaminants in shallow soils in Areas B and C would have been a result of the plant manufacturing processes and associated activities. With respect to OU8, the conceptual site model reflects potential impacts to soils in Areas B and C as a result of contaminants migrating from the plant process areas or being released by activities associated with the plant. Historic aerial photographs indicate that Areas B and C were not used for plant process activities. The primary concern was contamination of shallow (i.e., 0-2 feet) soil as a result of windblown transport, surface water runoff, spills and leaks, and/or disposal of construction debris. The current and anticipated land use is limited by the Conservation Easement to commercial/industrial. As such, the on-site worker exposure to shallow soil is the potential exposure pathway of concern for OU8. Ecological receptors could also be exposed to contaminants present in shallow soil.

Site Overview. Area B is 24.5 acres in size, and Area C covers 10.17 acres. Area B is an open field west-southwest of the main gate bordered by Kendrick Lane, the railroad tracks, and the plant access road, and includes the guard house building. Area B is an open field with vegetation ranging from grass to shrubs and small trees. Areas C is the parking lot and undeveloped areas on the northeast side of Kendrick Lane across from the main gate. The eastern portion of the area is partially paved with gravel and asphalt, and the western portion is vegetated and undeveloped. Nether parcel contains any surface water features.

Surface and Subsurface Features. The only structure that currently exists on Area B is the former main gate and office building located at the east end of the parcel. The only feature of Area C is the parking lot on the eastern portion. There are no known subsurface features.

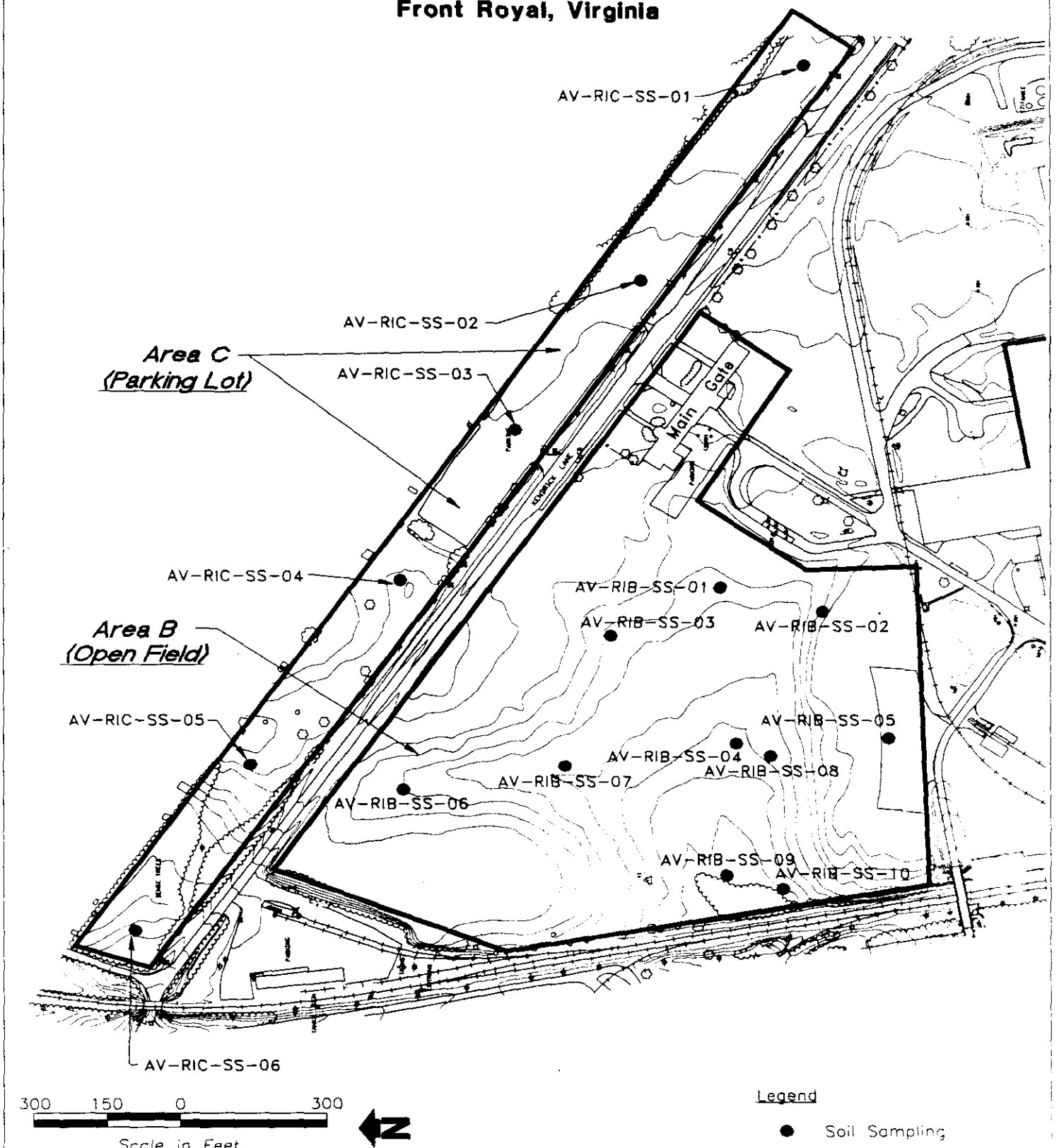
Potential Contaminant Sources. Areas B and C did not contain any known or suspected sources of contamination. Historic aerial photographs indicate that Areas B and C were not used for manufacturing or associated activities. Contaminants detected in Areas B and C must have migrated or been transported from the manufacturing areas.

Media of Concern and Sampling Strategy. Shallow soil (0-2 feet) is the only environmental media of concern. The investigation of Areas B and C focused on surface soils because the potential sources of contamination would have affected principally surface soils, not subsurface soil or ground water. Ten surface soil samples were collected from Area B, and six surface soil samples were collected from Area C. In the paved portion of Area C, samples were collected as deep as 3.3 feet below grade to obtain samples below the asphalt and material used as asphalt subgrade to ensure that samples from these locations were not impacted by semi-volatile organic compounds associated with the asphalt.

All of the soil samples were analyzed for the 18 Site constituents used throughout the Site as key indicators of contamination. In addition, split soil samples from each area were also analyzed comprehensively for Target Compound List (TCL) and Target Analyte List (TAL) constituents.

Nature and Extent of Contaminants. Soil sampling locations are shown in Figure 2. Table 1 summarizes the constituents detected in surface soil samples collected from Areas B and C that were analyzed for the 18 Site constituents and TCL/TAL constituents. Table 1 presents the minimum and maximum concentration of each detected constituent, the frequency of detection, and the EPA Region III risk-based screening levels as of April 1999 based on incidental ingestion of soil by on-site

Figure 2
Surface Soil Sample Locations
Areas B and C
Avtex Fibers Superfund Site
Front Royal, Virginia



ERM, NC

10555.03.01/05.24.99-CMP/05.26.99-CMP

AR300407

Table 1 Comparison of Constituents Detected in Areas B and C Surface Soils to Risk-Based Concentrations, Avtex Fibers Superfund Site, Front Royal, Virginia

Constituent	Minimum Concentration	Maximum Concentration	Frequency of Detection	Risk-Based Concentration (a)	Does Maximum Concentration Exceed RBC?
AREA B					
TCL Volatile Organic Compounds (µg/kg)					
Methylene Chloride	2J	12J	10/15	760,000 C	NO
2-Butanone (MEK)	5J	6J	2/15	120,000,000 N	NO
Tetrachloroethene	3J	3J	1/15	110,000 C	NO
TCL Base Neutrals/Acid Extractables (µg/kg)					
2-Methylnaphthalene	41J	44J	2/3	4,100,000 N	NO
Phenanthrene	66J	70J	2/3	NVL	
Pesticides (µg/kg)					
4,4-DDD	0.19J	0.19J	1/3	24,000 C	NO
4,4-DDT	0.69J	0.92J	2/3	17,000 C	NO
Aldrin	0.47J	0.49J	2/3	340 C	NO
Endrin Ketone (endrin)	0.57J	0.57J	1/3	61,000 N	NO
gamma-Chlordane (chlordane)	0.26J	0.26J	1/3	16,000 C	NO
Heptachlor epoxide	0.25J	0.44J	3/3	630 C	NO
TAL Inorganics (mg/kg)					
Arsenic	2.3	5.1	6/15	3.8 C	YES
Barium	40.1	54	3/3	14,000 N	NO
Beryllium	0.29	0.52	3/3	410 N	NO
Chromium	4.0	18.3	15/15	610 N (c)	NO
Cobalt	1.4	4.4	3/3	12,000 N	NO
Copper	8.7J	9.5J	3/3	8,200 N	NO
Lead	7.5	44.6	15/15	400 (b)	NO
Manganese	68.4L	145L	3/3	4,100 N	NO
Nickel	3.5	4.4	3/3	4,100 N	NO
Vanadium	21.0	36.2	3/3	1,400 N	NO
Zinc	9.9	100.0	15/15	61,000 N	NO
AREA C					
TCL Volatile Organic Compounds (µg/kg)					
Carbon Disulfide	4J	31	4/9	20,000,000 N	NO
Methylene Chloride	2J	4J	7/9	760,000 C	NO
2-Butanone (MEK)	2J	15	4/9	120,000,000 N	NO
TCL Base Neutrals/Acid Extractables (µg/kg)					
Bis(2-Ethylhexyl)phthalate	81J	81J	1/2	410,000 C	NO
Pesticides (µg/kg)					
4,4-DDD	0.30J	0.30J	1/2	24,000 C	NO
4,4-DDT	3.8J	3.8J	1/2	17,000 C	NO
delta-BHC (beta)	0.34J	0.34J	1/2	32,000 C	NO

Table 1 (Continued)

Constituent	Minimum Concentration	Maximum Concentration	Frequency of Detection	Risk-Based Concentration (a)	Does Maximum Concentration Exceed RBC?
TAL Inorganics (mg/kg)					
Arsenic	2.4	6.0	4/9	3.8 C	YES
Barium	40.8	48.4	2/2	14,000 N	NO
Beryllium	0.44	0.66	2/2	410 N	NO
Chromium	9.7	32.7	9/9	610 N (c)	NO
Cobalt	3	4	2/2	12,000 N	NO
Copper	8.1J	8.1J	1/2	8,200 N	NO
Lead	9.4	28.4	9/9	400 (b)	NO
Manganese	253L	293L	2/2	4,100 N	NO
Nickel	2.7	2.9	2/2	4,100 N	NO
Vanadium	23.8	30.2	2/2	1,400 N	NO
Zinc	7.3	28.8	9/9	61,000 N	NO

Qualitatively and quantitatively invalid results not included
µg/kg - micrograms per kilogram, mg/kg - milligrams per kilogram
TCL - Target Compound List, TAL - Target Analyte List
NVL - No value listed for EPA Region III RBC
J - qualifier denotes that the constituent was detected below the CRDL and the value reported is an estimate.
L - This result should be consider a biased low qualitative estimate.
(a) Source: EPA Region III Risk-Based Concentration Table, April 1999, industrial soil ingestion scenerio. Non-carcinogens (N) adjusted to relfect an HQ of 0.1 per Region III guidnance.
(b) Source: Revised Interim Soil Lead Guidance (EPA, 1994).
(c) The RBC for chromium assumes 100% of the chromium reported as chromium VI.

workers for an industrial exposure scenario. The Region III risk-based concentrations (RBCs) are based on a $1x10^{-6}$ risk level for carcinogens, and, as per Region III guidance, a Hazard Index of 0.1 for noncarcinogenic constituents. As indicated in Table 1, arsenic was the only detected constituent that exceeded a risk-based screening level; however, the detected arsenic concentrations were similar to the range of concentrations for this metal detected in background surface soil samples collected during the Site-wide remedial investigation conducted in 1993-94. None of the constituents detected in the surface soil samples were identified as constituents of concern that required further risk evaluation as a result of the risk-based screening.

Based on the lack of contaminant concentrations at levels of concern in shallow soil, EPA determined that deeper soil and ground water in Areas B and C have not been adversely affected from the migrations of contaminants from the manufacturing areas. Furthermore, with respect to ground water beneath, Areas B and C are not hydraulically downgradient of areas of the Site with known ground water contamination.

Potential Receptors and Exposure Pathways. Under current and anticipated future land use (i.e., commercial/industrial redevelopment), the potential receptors of concern are on-site workers who could be exposed to shallow soil. Ecological receptors could also be exposed to constituents detected in shallow soil as a result of ingestion of or contact with the shallow soil.

F. Current and Potential Future Land and Water Uses

Areas B and C are permanently restricted by a legally enforceable restrictive covenant. The Conservation and Environmental Protection Easement and Declaration of Restrictive Covenants ("Conservation Easement") filed December 7, 1999 with the Clerk's Office of Warren County, Virginia (Instrument # 990008268). The Conservation Easement restricts the portion of the site designated as Areas B and C to commercial/industrial use based on the Code of Town of Front Royal, Virginia, and other requirements or prohibitions specified in the Conservation Easement The Conservation Easement is part of the Administrative Record. Areas B and C do not contain any surface water features, and use of ground water is not anticipated because the Site is served by a municipal water supply system. In addition, the Conservation Easement prohibits use of ground water for any purposes.

Currently, adjacent land use consists of residential use to the northeast of Areas B and C, and commercial/industrial use for the remaining areas surrounding Areas B and C. The land use of adjacent property is not expected to change in the future.

G. *Summary of Site Risks*

Maximum concentrations of the constituents detected in shallow soil samples from Areas B and C were screened against EPA Region III risk-based screening criteria for an industrial exposure scenario for soil. The screening results indicate the maximum concentrations of all the constituents are either below EPA Region III's risk-based criteria for an industrial exposure scenario, or are within the range of concentrations detected in background surface soil samples collected during the 1993-94 Site-wide remedial investigation. Using an institutional control that permanently restricts land use to commercial/ industrial, the current and anticipated future risks associated with the residual contamination of the shallow soil in Areas B and C are below EPA's threshold criteria of $1x10^{-6}$ for carcinogenic risk and the Hazard Index of 1.0 for non-carcinogenic constituents.

Also, as determined by EPA's ecological risk assessment completed in February 1999, risks to ecological receptors were not identified. Consequently, constituents of concern were not identified for Areas B and C, and there are no risk drivers for these areas.

Although the residual contamination in shallow soil in Areas B and C does not pose an unacceptable risk to human health under an industrial soil exposure scenario, the human health risks associated with land use other than commercial/industrial use were not evaluated.

H. *Remedial Action Objectives*

Comparison of the analytical results obtained from Areas B and C to risk-based screening levels indicate that the few constituents detected in the soil are below EPA Region III risk-based criteria for soil ingestion under an industrial exposure scenario. Consequently, the soils in Areas B and C do not pose a risk to human health from exposures for a commercial/industrial scenario.

There is residual contamination present in shallow soil in both Areas B and C in the form of anthropogenic organic compounds. These compounds may pose a risk to human health under a residential scenario, but these risks were not evaluated. The permanent restriction on Areas B and C for commercial/industrial land use rule out the possibility of a residential land use scenario. Consequently, screening against residential RBCs was neither warranted nor performed.

Applicable or Relevant and Appropriate Requirements (ARARs) would include federal environmental laws and regulations or state environmental or facility siting laws that must be attained to implement the remedy. Section M contains a discussion of ARARs. Based upon EPA's evaluation, there are no ARARs for Areas B and C that need to be achieved.

Based on the above, the Remedial Action Objective (RAO) for Areas B and C is to ensure that the reasonable anticipated future land use remains commercial/industrial in perpetuity. Institutional Controls, currently in the form of a Conservation Easement, fulfills that RAO. The purpose of this remedial action is to alert future owners and users of Areas B and C about the residual contamination, and to monitor Areas B and C to ensure the protection of human health and the environment.

I. Description of Alternatives

Two alternatives were identified as potential remedies for Areas B and C as follows:

Alternative No. 1 – No Action; and

Alternative No. 2 – Institutional Controls.

Each of these alternatives is described below, and results of the evaluation of each alternative relative to the nine evaluation criteria identified in the NCP are also summarized.

Alternative No. 1 – No Action. Under the "No Action" alternative, institutional controls would not be implemented to restrict future land use for Areas B and C. Consequently, once Areas B and C were removed from the Site NPL boundary, these parcels would be available for unrestricted future land use, including residential development. Because the residual contamination in Areas B and C was not evaluated with respect to risks to human health using a residential exposure scenario, there is uncertainty with respect to the risks to human health. Shallow soils in Areas B and C may pose a risk to human health under a residential land use scenario. Consequently, the "No Action" alternative may not be protective of human health. There are no ARARs that need to be attained, so this threshold criterion is not an issue.

The "No Action" alternative will not provide long-term effectiveness in meeting the RAO of ensuring that future land use remains restricted to commercial/industrial development. This alternative will not reduce the concentrations of residual contamination in Areas B and C; however, the presence and concentrations of the

detected contaminants do not pose a risk to human health or the environment under a commercial/industrial use scenario. There are no short-term risks to the community and on-site workers. There are no costs associated with implementation of the "No Action" alternative, and this alternative can easily be implemented. Because the risks to residential users were not evaluated and if there were an absence of institutional controls for future land use, the Commonwealth of Virginia may not accept the "No Action" alternative. The public may not accept this alternative for the same reasons.

Alternative No. 2 – Institutional Controls. This alternative consists of:

- institutional controls to permanently restrict land use of Areas B and C to commercial/industrial.

Use of institutional controls will prevent unacceptable exposures to residual contamination associated with the reasonably anticipated future land use for commercial/industrial development. In addition, EPA will continue to monitor the Site to ensure that the land use restrictions are adhered to.

At the present, an institutional control is in place for the entire Avtex Site. A Conservation Easement filed on December 7, 1999 permanently restricts Areas B and C to commercial/industrial land use. The Conservation Easement is recorded in the Warren County, Virginia Land Records Office where the Site is situated. An institutional control such as this Conservation Easement is the type of control expected to be used to meet the remedial objective for this alternative.

In addition to restricting the uses of Areas B and C, the Conservation Easement specifies covenants, conditions and restrictions for the entire Avtex property and is binding on current and future parties associated with the Site. These provisions include:

- Use of ground water in any manner is prohibited.

- Areas B and C (referred to in the Conservation Easement as Parcels 2A and 2 B, respectively) are restricted to light industrial or commercial use.

- Light industrial use specifically means only those uses permitted by Section 175-65(A) of the Code of Town of Front Royal, Virginia, or as said ordinance or substantially similar successor zoning district ordinance relating to light industrial use may from time to time be amended, except that uses currently identified in Section 175-65(A)(5), Section 175-55(A)(11), (12), (13), (21), and (24) and Section 175-56 of the code are prohibited forever.

- Commercial use specifically means only those uses permitted by Section 175-39 of the Code of Town of Front Royal, Virginia or as said ordinance or substantially similar successor zoning district ordinance relating to commercial use may from time to time be amended, except that uses currently identified in Section 175-39(A)(15), (27) (with respect to tourist homes, boarding houses and rooming houses) and (35), Section 175-(B)(3) (with respect to schools), (4), (5), (10) (with respect to any residential use), (14) and (15) and Section 175-39(C)(2) are prohibited forever.

Although the residual contamination in Areas B and C pose no risk to human health under a commercial/industrial exposure scenario, a residential use scenario was not evaluated, and residual contamination in Areas B and C may pose a risk to human health under residential land use. However, the institutional controls restricting land development to commercial/industrial use will be protective of human health because they prohibit residential use. There are no ARARs that need to be attained, so this threshold criterion is not an issue.

Institutional controls that permanently restrict land use will provide long-term effectiveness to meet the RAO and ensure that land use for Areas B and C remains commercial/industrial. This alternative will not reduce the concentrations of residual contamination in Areas B and C; however, the presence and concentrations of residual contamination in these areas do not pose a risk to human health for commercial/industrial land use. There are no short-term risks to the community or on-site workers associated with implementation of Alternative No. 2, and this alternative can easily be implemented for costs anticipated to be less than $10,000. The Commonwealth of Virginia supports the institutional controls because land use will be restricted to a use that is protective of human health. The public did not raise any concerns with the use of institutional controls, therefore this alternative is considered acceptable.

J. Comparative Analysis of Alternatives

Alternative No. 2 – Institutional Controls is the preferred alternative. The institutional controls called for under Alternative No. 2 and those already in effect that restrict future development of Areas B and C for commercial/industrial use are more protective of human health than Alternative No. 1. Although residual contamination in these areas do not pose a risk to human health under a commercial/industrial use scenario, a residential use scenario was not evaluated since it may never occur. Alternative No. 1 does not meet the RAO of ensuring that land use for Areas B and C remains commercial/industrial in the long-term, and therefore may not be protective of human

health. Alternative No. 2 is acceptable to the Commonwealth of Virginia. In addition, the public did not object to the preferred alternative.

K. Principal Threat Wastes

The residual contamination in Areas B and C is not a principal threat waste.

L. Selected Remedy

The Selected Remedy is Alternative No. 2 - Institutional Controls. Of the alternatives that were evaluated, this alternative is the most protective of human health, and this alternative best satisfies the nine evaluation criteria.

The Selected Remedy is:

- institutional controls which permanently restrict the land use of Areas B and C to commercial/industrial.

The estimated remedy costs are anticipated to be less than $10,000 to cover legal fees and fees associated with filing the deed. There are no capital or operation and maintenance costs associated with the Selected Remedy. The expected outcome of the Selected Remedy will be immediate use of the property for commercial/industrial use. The Selected Remedy will ensure that the residual contamination in Areas B and C will not pose a risk to human health in the future.

M. Statutory Determinations

The Selected Remedy will satisfy the statutory requirements of CERCLA §121 (as required by the NCP (§300.430(f)(5)(ii)). The following information identifies each statutory requirements and describes how the remedy meets those requirement.

Protection of Human Health and the Environment. The Selected Remedy, institutional controls, adequately protects human health and the environment by restricting future land use of Areas B and C to commercial/industrial development in perpetuity. The Selected Remedy will effectively control exposures and thereby protect human health and the environment. The Selected Remedy will ensure that risks to human health remain below $1x10^{-6}$ for carcinogenic risk and below the Hazard Index of 1.0 for non-carcinogenic risk.

Compliance with Applicable or Relevant and Appropriate Requirements. EPA has determined that there are no ARARs that need to be attained for the selected remedial action. There are no ARARs which specify soil cleanup levels. EPA did consider the National Historic Preservation Act of 1966, as amended. This Act requires that the remedial action take into account effects on properties included on or eligible for the National Register of Historic Places. Because institutional controls would not disturb any potential cultural resources present in Areas B and C, there is no effect on the property. Further, the action selected is for this operable unit and is not a final ROD for the Site.

Cost-Effectiveness. The Selected Remedy is cost-effective with respect to the protectiveness provided. Placing permanent land use restrictions on Areas B and C is more reliable over the long-term and provides a cost-effective solution for protecting human health and the environment.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable. The Selected Remedy does not employ treatment or resource recovery technologies. Treatment of shallow soils in Areas B and C is not required to achieve protection of human health and the environment. Soil concentrations in these Areas do not pose an unacceptable risk for commercial/industrial use. The institutional control required by the Selected Remedy provides overall protectiveness and long-term effectiveness because it is directly linked to the future land use and it can be enforced by EPA.

Preference for Treatment as a Principal Element. The statutory preference for treatment as a principal element of the Selected Remedy is not addressed because treatment of residual contamination in these areas is not required to achieve protection of human health and the environment. Soil contaminant concentrations in Areas B and C do not pose an unacceptable risk for the reasonably anticipated commercial/industrial use.

Five-Year Review Requirement. Because residual contamination will remain in Areas B and C that will not allow for unlimited use and unrestricted exposure, it will be necessary for EPA to conduct five-year reviews after the remedial action to assure that human health and the environment are being protected.

N. Documentation of Significant Changes

The Proposed Plan Fact Sheet for OU8 of the Avtex Fibers Site was released for public comment on August 2, 2000. The Proposed Plan Fact Sheet identified Alternative No. 2, Institutional Controls, as the Preferred Alternative to address Areas B and C. EPA reviewed all written and verbal comments during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan Fact Sheet, were necessary or appropriate.

III. RESPONSIVENESS SUMMARY

The public comment period on the Proposed Plan for Areas B and C, OU8, at the Avtex Fibers Site was held from August 2, 2000 to September 1, 2000. Comments received during this time are summarized below. Section A addresses those concerns and issues generated during the public meeting on August 17, 2000. The Agency received one written comment which is addressed in Section B.

A. *Summary of Major Issues and Concerns Raised by Commentors during the Public Meeting*

1. A citizen asked why restrictions were necessary on the two parcels of land.

   EPA Response: Reasonably anticipated future use of the land is an important consideration in determining the need for and/or appropriate extent of remediation. Future use of the land affects the types of exposures and the frequency of exposures that may occur in regard to any residual contamination at the Site, which in turn affects the nature of the remedy proposed and chosen. Based on the known anticipated land use, a commercial/industrial setting was evaluated. While that evaluation determined there was no risk to commercial/industrial users, limiting the land use is necessary to ensure that Areas B and C are not ultimately converted to some other use.

2. A citizen questioned how long would it be before Area B and Area C are removed from the Superfund Site.

   EPA Response: EPA estimates that these areas will be removed from the Superfund Site listing by the Summer of 2001.

3. A citizen inquired how the potential risk to a construction worker due to inhalation and dermal contact are considered for land use which is commercial/industrial.

   EPA Response: A construction worker would have a much shorter duration of exposure than commercial workers (1 year vs. 25 years). The potential risk to a construction worker would be negligible. The ingestion route of exposure, as compared to dermal contact or inhalation, is the risk driver for arsenic. In addition, the highest level of arsenic found in soil was 6 mg/kg. This is considered a naturally occurring level for arsenic in soil for this area. For these reasons, construction worker risks were not evaluated.

4. A citizen asked how long EPA would monitor the Site.

EPA Response: EPA will conduct formal reviews at least every five years to monitor the Site for any changes. This type of review will analyze the effectiveness of the institutional controls, in this case to ensure that the conditions of the Conservation Easement are being adhered to and remain protective. There is no limit on how long EPA will monitor the Site as part of the formal review process. In addition, EPA has had a long-term presence at the Site. Future cleanup work is expected to last for an additional 5 to 10 years. In addition to the formal reviews, EPA will be in a position to monitor informally the Site for a significant period of time.

5. A citizen questioned whether there were things in the soil that were not good for residential use.

EPA Response: EPA did not evaluate a residential scenario. Reasonably anticipated future use of the land is an important consideration in determining the need for and/or appropriate extent of remediation. Future use of the land affects the types of exposures and the frequency of exposures that may occur to any residual contamination in Areas B and C, which in turn affects the nature of the remedy proposed and chosen. A reuse plan for Avtex was developed and approved by the Town of Front Royal and the County of Warren. That plans calls for commercial/industrial use of Areas B and C. Because we knew these areas of the Site will be redeveloped for commercial/industrial use, EPA evaluated Areas B and C under a commercial/industrial exposure scenario.

6. A citizen inquired what the basis for determining the risk-based ingestion values for 25 years is? Were animal and humans actually tested?

EPA Response: EPA bases the default soil ingestion rate in adults on three studies conducted by two separate researchers (Hawley and Calabrese). These studies focused on measuring soil intakes in human volunteers. From the conclusions of these human studies, EPA recommends soil ingestion rates of 50 mg/day for commercial/industrial settings and 100 mg/day for residential settings.

7. A citizen questioned how people who have gotten cancer due to arsenic were exposed suggesting that it is unlikely that they were eating soil.

EPA Response: Most epidemiological studies for arsenic involve occupational exposures (via the inhalation route) or accidental exposures in communities (via ingestion of contaminated water or food). These studies demonstrate a significantly increased incidence of cancer in arsenic-exposed populations. Based on scientific principles related to mechanisms of toxicity, the potential for arsenic to cause cancer through ingestion of other contaminated sources, such as soil, can be inferred.

8. A citizen raised a question regarding the concentration of arsenic present in the two areas and what concentrations would put an individual at risk.

EPA Response: Arsenic levels exceeded the risk-based screening number of 3.8 parts per million (ppm) for industrial soil in 3 samples. Specifically, concentrations of 4.5 ppm, 5.1 ppm and 6 ppm were reported. EPA has determined that the arsenic levels found are indicative of naturally occurring soil levels and are consistent with background concentrations of arsenic determined during a previous site investigation.

With regard to potential for risk, arsenic is a naturally-occurring element in the earth's crust. Consequently, arsenic is often found in soil and water, even in pristine areas of the United States. According to geological surveys arsenic is present in unpolluted soils of the eastern United States at concentrations ranging from less than 0.1 mg/kg to 73 mg/kg.

From toxicity data in the scientific literature, EPA Region III has calculated a generic risk-based concentration (RBC) of 3.8 mg/kg for arsenic in soil. This RBC was developed for screening purposes, and considers exposure to arsenic-contaminated soil under an industrial or commercial scenario. At the RBC, the excess cancer risk associated with exposure to arsenic is 1 in one million. In other words, if a worker is exposed to 3.8 mg/kg of arsenic in soil for 25 years, the chance of getting cancer as a result of exposure is 1 in one million. EPA generally defines an excess cancer risk greater than *1 in ten thousand* to be unacceptable. Under conditions of industrial or commercial land use, arsenic concentrations as high as 380 mg/kg in soil could be considered acceptable, assuming the absence of other environmental chemical contaminants.

Toxicity criteria used to estimate risks for arsenic, are very stringent; therefore, risk-based screening levels are often exceeded - even at concentrations considered to be within the naturally-occurring range for arsenic. Further, due to controversy associated with the toxicity criteria for arsenic, considerable uncertainty is associated with this chemical's RBC. For these reasons, consideration of location-

specific arsenic concentrations in areas is critical. Very often, for arsenic, these "background" concentrations, rather than risk-based screening levels, determine the need for action.

9. A citizen questioned why a residential setting where an individual might spend 12 hours a day would be different than a commercial/industrial setting where someone might spend 12 hours a day.

EPA Response: Under EPA's default exposure scenario for a residential setting, the contact rate for soil ingestion is 100 mg/day and the exposure duration of 350 days/year is used. For a commercial/industrial setting a contact rate of 50 mg/day and an exposure duration 250 days/year is used. Therefore, the residential scenario is more conservative than the commercial/industrial exposure scenario.

10. A citizen questioned the risk to wildlife from metals and other contaminants that would come up through grasses.

EPA Response: Grass and plants are considered a lower level of the food chain and were not directly analyzed as part of EPA's site-wide Ecological Risk Assessment. However, based on the Ecological Risk Assessment conducted, we can infer that there would not be an ecological risk based on wildlife eating grasses. Small animals that feed on both animal and plant substances were evaluated as part of the Site-wide assessment. Small mammals were evaluated because many of the contaminants of concern would be observed at higher concentrations in the upper levels of the food chain and would represent a worst case scenario. Tissues from small mammals in the area were analyzed and the concentrations of contaminants found were compared to literature values to determine the risk to small mammals. The concentrations found in the small mammals collected were lower than the literature values. In addition, sections of liver and kidney from the small mammals collected were evaluated for histopathological anomalies. The results indicated that the tissues were well preserved and not abnormal.

In addition, at this Site, lower levels of the food chain were also evaluated. Earthworms which feed on plants were selected to represent this lower level. Toxicity tests which evaluated survival and growth were used to evaluate risk. The results indicated that there was no significant reduction in survival or growth of the earthworms. Additionally, earthworm tissue was analyzed to determine the level of contaminants present. The levels of contaminants found in the earthworm tissue were lower than literature values.

Based on the results of the worst case scenario and the lower levels of the food chain we concluded there is no ecological risk associated with exposure to Site soils.

B. Summary of Major Written Comments and Questions Received During the Public Comment Period

1. EPA received one letter from the Valley Conservation Council. That letter supports Alternative 2 -- Institutional Controls.

EPA Response: EPA appreciates the Council's support for the proposed remedy.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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September 27, 2000

Mr. Abraham Ferdas, Division Director
Hazardous Dite Cleanup Division (3HS00)
U.S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Re: Record of Decision for Operable Unit 8 (Areas B & C),
Avtex Fibers Site, Front Royal, Virginia

Dear Mr. Ferdas:

The Virginia Department of Environmental Quality (VDEQ) staff has reviewed the above referenced Record of Decision (ROD) for Operable Unit 8, Areas B and C which consist of approximately 24 acres of open field 10 acres of paved parking lot. We concur with the selected remedial alternative as outlined in the ROD dated September 2000.

Should you have any questions concerning this letter, please feel free to contact Berry Wright at (804) 698-4012.

Sincerely,

Erica S. Dameron
Office Director
Remediation Programs

cc: Bonnie Gross, RPM EPA Region III
Karen J. Sismour, VDEQ
Berry Wright, VDEQ
Ray Tesh, VRO-VDEQ

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